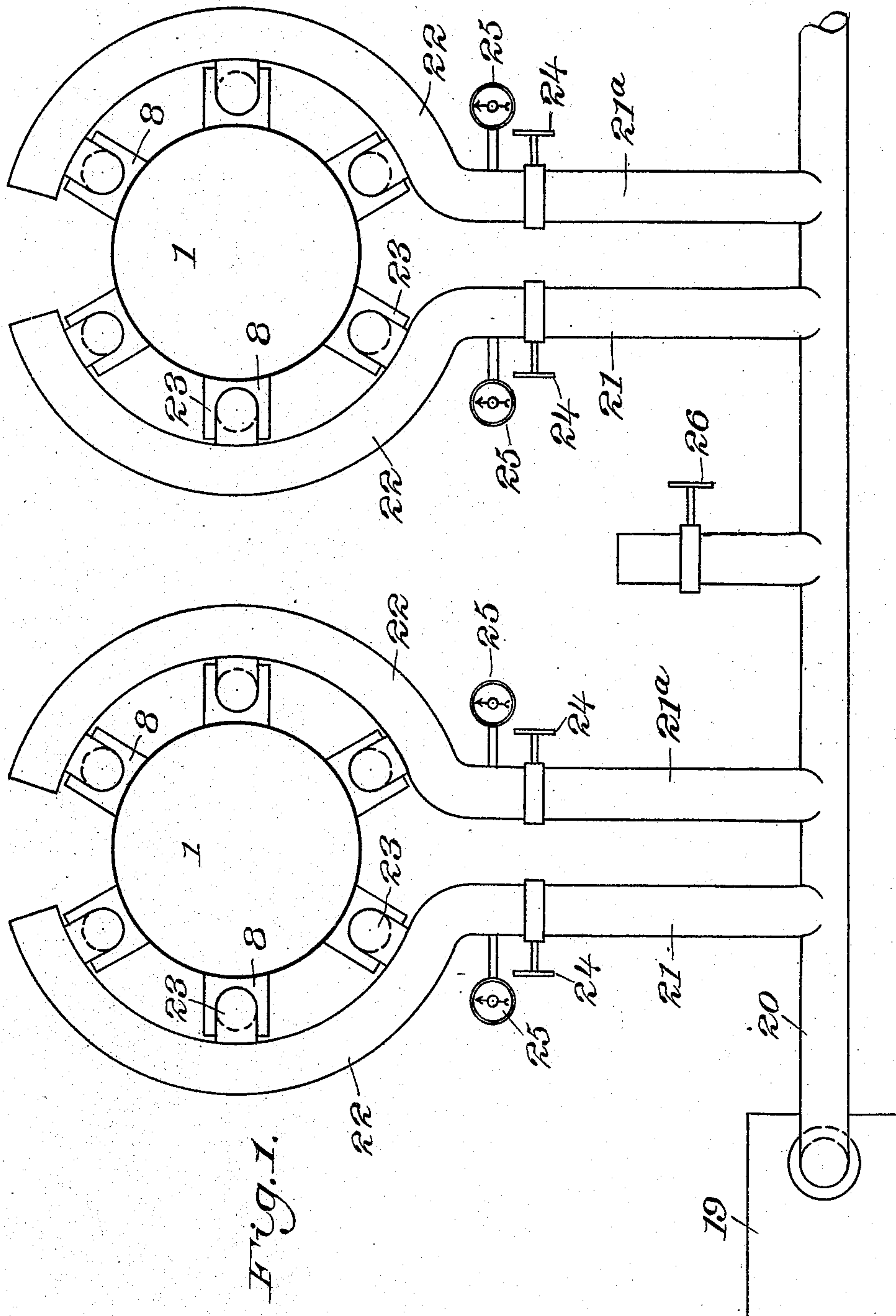


W. S. DEMPSEY.
METALLURGICAL FURNACE.
APPLICATION FILED SEPT. 7, 1908.

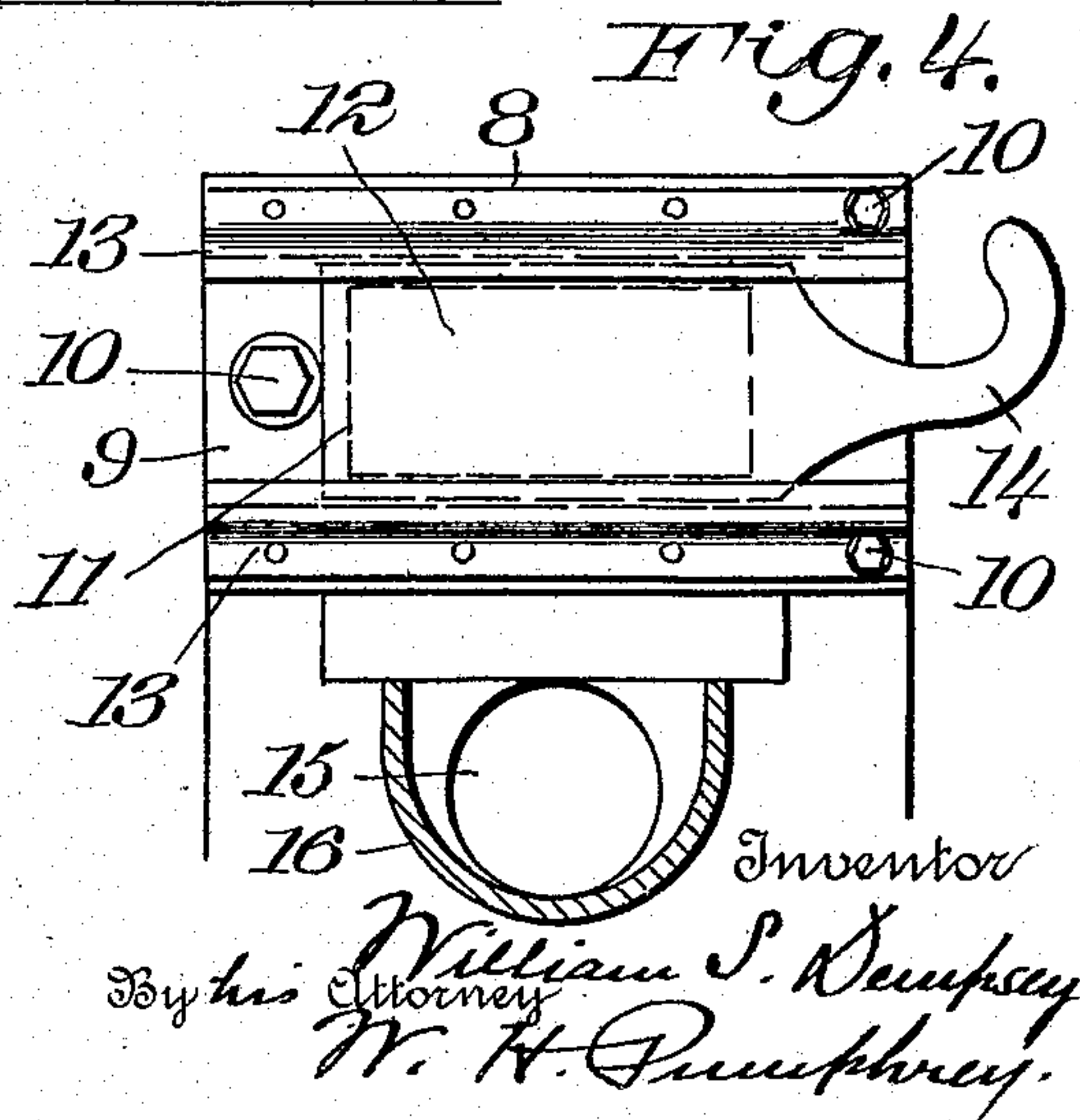
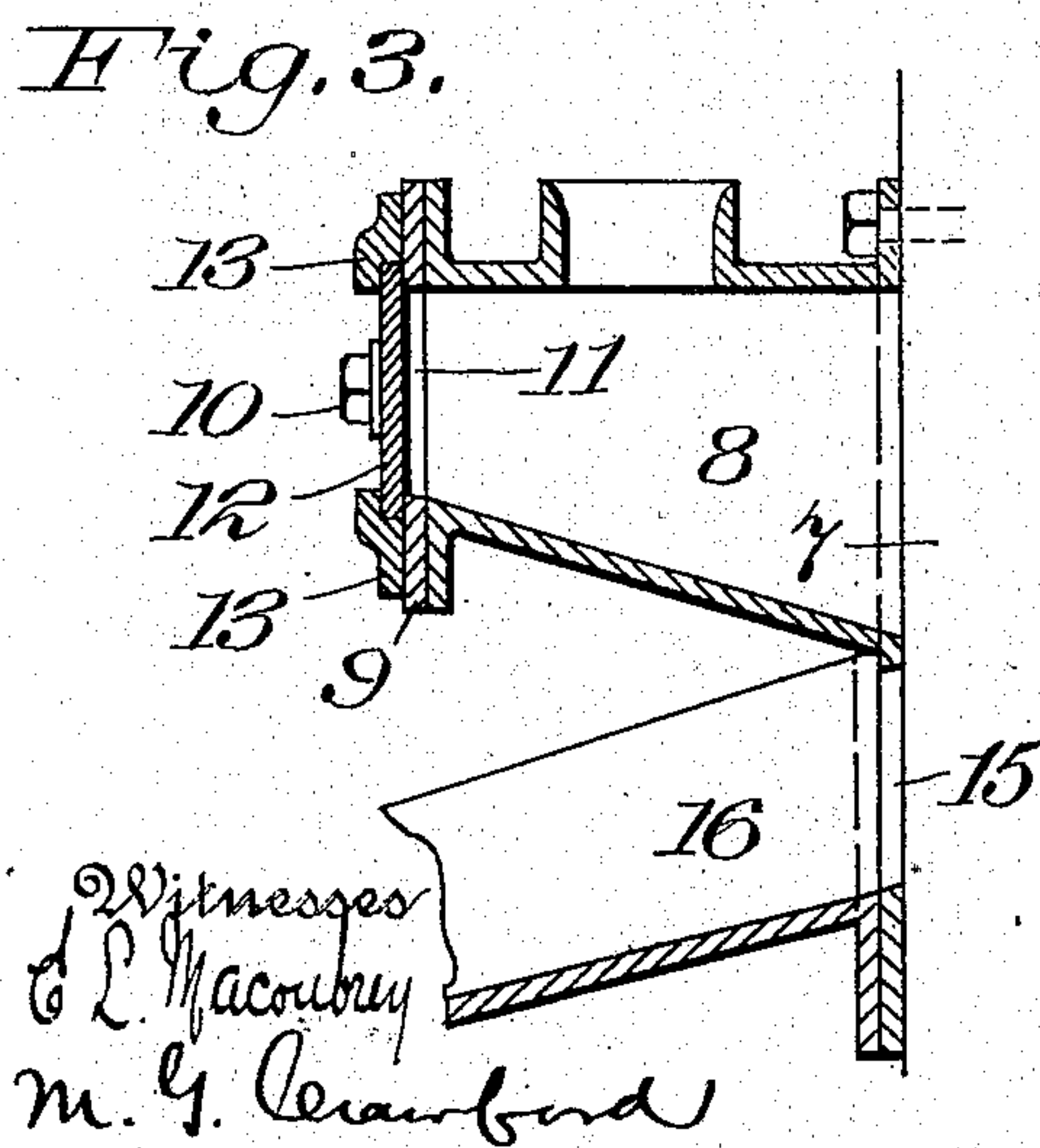
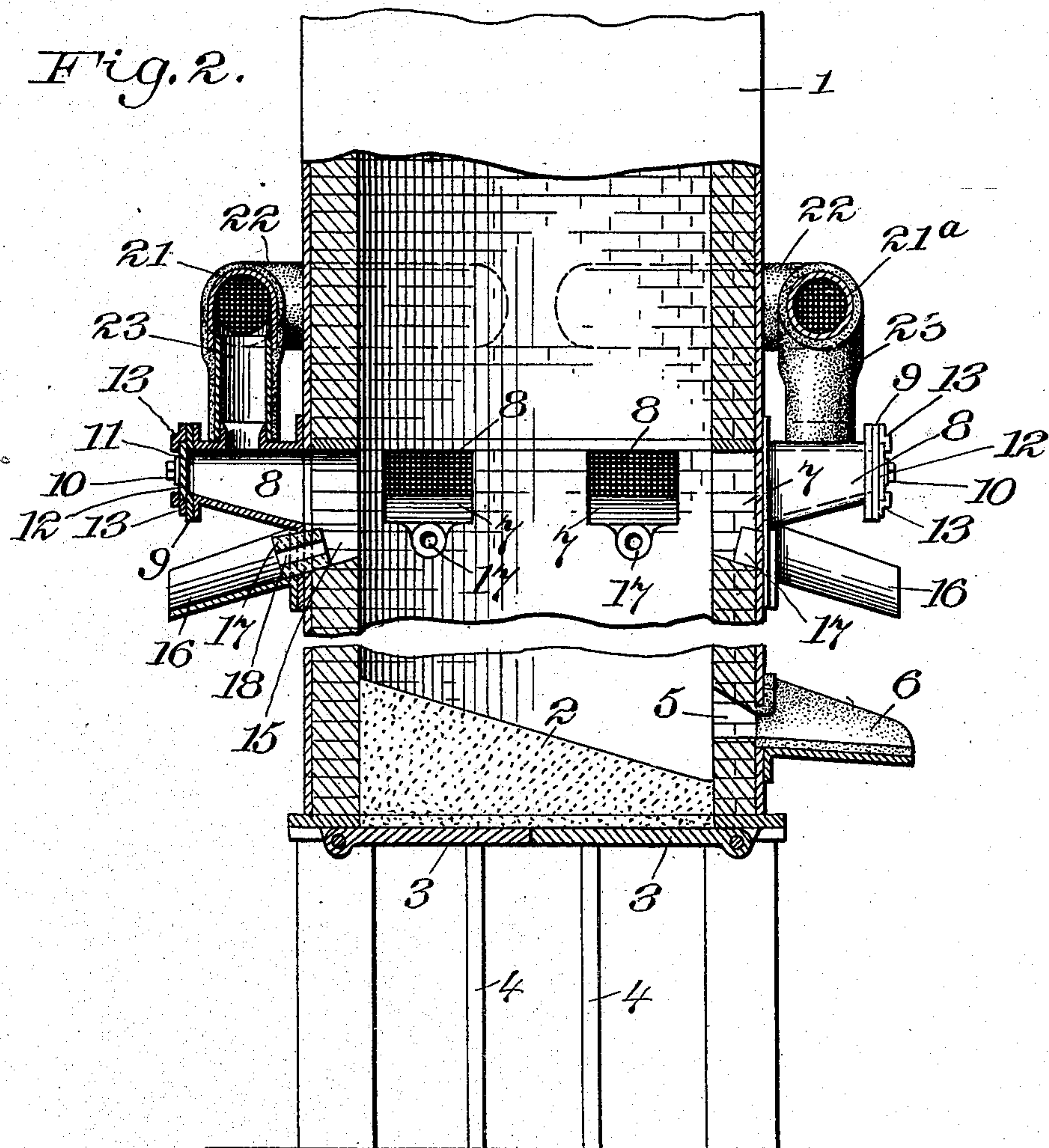
900,916.

Patented Oct. 13, 1908.
2 SHEETS—SHEET 1.



Witnesses
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UNITED STATES PATENT OFFICE.

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METALLURGICAL FURNACE.

No. 900,916.

Specification of Letters Patent.

Patented Oct. 13, 1908.

Application filed September 7, 1906. Serial No. 333,719.

To all whom it may concern:

Be it known that I, WILLIAM S. DEMPSEY, a citizen of the United States, residing at No. 548 West Fifty-fifth street, borough of Manhattan, city, county, and State of New York, have invented new and useful Improvements in Metallurgical Furnaces, of which the following is a specification.

My invention relates generally to metallurgical furnaces and as herein embodied, is designed for use with furnaces of the cupola type.

The invention has particular reference to means for supplying, distributing and regulating the air blast of furnaces, the object being to provide such complete control of the blast as will permit the effective pressure and volume thereof to be varied at any one or more points of application independently of the others, also uniformly at all points of application, the advantages of which will be obvious.

A furnace constructed in accordance with my invention is illustrated in the accompanying drawings. I wish it understood, however, that I do not limit myself to either the form or arrangement shown, as various changes may be made therein, or other types of furnaces employed without departing from the spirit and scope of my invention.

In the drawings: Figure 1 is a diagrammatic plan view showing the connections from the source of air supply to several furnaces, also the controlling valves, etc. by which the effective pressure and volume of the blast may be varied as required. Fig. 2 is a sectional view of one of the furnaces shown in Fig. 1. Fig. 3 is an enlarged detail view of one of the sectional twyer boxes, and Fig. 4 is a front view thereof.

Referring now to the drawings, 1 represents a cupola of a form well known in the art. Ordinarily it is constructed of double riveted boiler plate lined with shaped fire brick and is provided below an inclined hearth 2, of sand or other suitable material, with hinged drop doors 3, which may be supported in any suitable manner, as for example by the removable uprights 4 shown. The tapping hole is represented at 5, and extending outward from the same there is the usual spout 6.

At a suitable distance above the hearth a series of twyer openings 7, are formed, which are preferably equi-spaced throughout the circumference of the shell, as shown.

Forming a continuation of each opening 7, there is a twyer box 8, to which air is supplied under pressure through connections to be later on described.

The twyer boxes are formed in sections, that is to say, they are provided with removable front plates 9, secured in position by bolts 10. Coöperating with an opening 11, formed in the front plate of each twyer box, there is a gate valve 12, which is movable in guides 13, secured to the plate, and by means of a handle 14, may be shifted to partly or completely close the opening and thereby vary the effective pressure and volume of the blast as required.

Immediately below each twyer box, a tapping hole 15 is formed and extending outward therefrom there is a short trough or spout 16. Plugs 17 of wood or fusible material, are driven in the holes 15, and are provided with openings 18 for the escape of the slag or molten metal or both. Such an overflow serves to call attention of the workmen in charge to the rise of the metal, and by pulling out one or more of the plugs or permitting them to burn out or fuse, the entire removal of the slag is readily effected and the rise of metal checked and prevented from entering the twyer boxes.

For the supply of air under pressure to one or more cupolas, as shown in Fig. 1, I employ a positive blower, that is to say, a low pressure air compressor, which is indicated at 19.

A supply main 20 from the blower 19, is tapped at two points opposite each cupola, and connected to the same at such points, there are two pipes 21, 21^a, which are closed at their outer ends and have oppositely curved portions 22 conforming approximately to the shell of the cupola.

Each cupola, as here shown, is provided with six twyer boxes, which, through branch connections 23, are divided into sets of three, one set being connected on pipe 21, and the other set on pipe 21^a.

It will be observed that by means of this arrangement, the volume and pressure of air in pipe 21 for example, or the blast delivered through the set of twyer boxes connected on this pipe, may be varied independently of the delivery through pipe 21^a. For the regulation of the supply, these pipes are each provided with a valve 24, and a pressure gage 25, as indicated in Fig. 1.

As the volume and pressure of air from a

positive blower is constant, provision is made herein for effecting the required variation by placing a pressure regulating valve 26 in the supply main 20. The partial opening of
5 this valve provides a direct outlet for the air in the main 20 to the atmosphere, and consequently produces a uniform reduction in both pressure and volume of the blast for the several cupolas.

10 From the foregoing it will be seen that the twyer boxes may be controlled individually, in sets, or collectively, the valves 12 serving to control the same individually, the valves 24 for the control in sets, and the
15 valve 26 to collectively control the boxes of one or more furnaces, thus making it possible to adapt the blast to any and all conditions likely to exist in cupola practice.

Having, therefore, described my invention,
20 I claim:

1. The combination of a furnace, means supplying a blast at different points in the furnace, and a valve for directing the blast
25 either wholly into the furnace or wholly into the atmosphere or partly into the furnace and partly into the atmosphere.

2. The combination of a furnace, and requisite blast connections terminating in twyer boxes at different points in the furnace, the front plate of each of said boxes
30 being removable and provided with a valved outlet to the atmosphere through which the blast may be wholly or partly directed.

3. The combination of a furnace, means supplying a blast at different points in the
35 furnace, an individual controlling means for varying the effective pressure of the blast at each point of application, a controlling means for varying the pressure at more than one point of application, and a common con-
40 trolling means for uniformly varying the pressure at all points of application.

4. The combination of a furnace provided with a series of valved twyers, a source of supply of air under pressure, valve-con-
45 trolled means connecting the twyers in sets with the source of air supply, and a regulating valve common to the several sets for uniformly varying the pressure.

5. The combination of a furnace, means 50 supplying a blast of constant volume and pressure at different points in the furnace, an individual controlling means for varying the volume and pressure of the blast at each point of application, a controlling means for
55 varying the volume and pressure at more than one point of application, and a common controlling means for uniformly varying the pressure at all points of application.

In testimony whereof, I affix my signature, 60 in the presence of two witnesses.

WILLIAM STEPHEN DEMPSEY.

Witnesses:

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M. G. CRAWFORD.